ORIGINAL ARTICLE

Food Insecurity and Coping Strategies amongst Undergraduate Students during the COVID-19 pandemic in Malaysia

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ABSTRACT

Introduction: Undergraduate students are at a high risk for food insecurity and knowledge on relevant coping strategies is the key issue in dealing with food insecurity. Therefore, this study is aimed at determining the food insecurity status, coping strategies, and the factors associated with food insecurity and coping strategies during the COVID-19 pandemic. **Methods:** This cross-sectional study involved 383 undergraduate students from health-related courses at the International Islamic University Malaysia Kuantan campus. The participants were selected by convenience sampling. The instrument used for data collection was a self-administered questionnaire consisting of three parts: socio-demographic background, food insecurity, and coping strategies. The data were analysed as descriptive and inferential analyses, such as Chi-Square, Mann-Whitney, and Kruskal-Wallis. **Results:** It was found that 21.41% of the participants reported experiencing food insecurity. There were significant associations between parents' income (p<0.001), financial status (p<0.001), academic performance (p = 0.04) and working part-time (p = 0.01) with food insecurity. It was also discovered that there were significant associations between working part-time (p<0.001), faculty of study (p<0.001), academic year (p<0.001), financial status (p<0.001), academic cumulative grade point average (CGPA) (p<0.001) and monthly expenses (p = 0.01) with Malaysian Coping Strategies Instruments (MCSI) score. A significant association between food insecurity and MCSI score (p<0.001) was also found in this study. **Conclusion:** The prevalence of food insecurity was consistent with previous studies, which is considered high in Malaysia. The findings could assist university authorities to identify the characteristics of the students that are related to food insecurity.
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INTRODUCTION

Food insecurity has been identified as one of the major concerns globally. In 2020 (the latest available data), nearly 3.1 billion people lacked appropriate food, which is112 million more people than in 2019 (1). Food insecurity happens when there is a lack of consistent access to enough food for an active and healthy life (2). While global prevalence of food insecurity has been steadily increasing since 2014, the projected increase in 2020 was equal to the prior five years combined (1). According to new estimates for 2021, the prevalence of moderate food insecurity has remained relatively unchanged from 2020, but the prevalence of severe food insecurity has increased to 11.7% (1). Amongst those who are commonly affected by food insecurity are students, particularly undergraduate students (2). The latest systematic review that examined 16 studies found that the prevalence of food insecurity amongst undergraduate students ranged from 21% to 82% across studies (3). The prevalence of food insecurity amongst undergraduate students was found to be between 32% and 60% in the United States of America (4,5) and 60% in South Africa (6). In Malaysia, the prevalence rates of food insecurity amongst undergraduate students were also not much different from previous studies conducted worldwide, which ranged from 22% to 67.7% (2,7,8). The proportion of food insecurity amongst undergraduate students is believed to have increased as a result of the COVID-19 pandemic (9). Previous studies examining food insecurity before and during the COVID-19 pandemic have found that a larger proportion of undergraduate students were food insecure before the pandemic, especially if the students opted to stay on campus during the pandemic (9,10).

The World Health Organisation (WHO) emphasised the significance and close relationship between nutrition and health because adequate nutrition and health will influence the growth, productivity, and individuals' quality of life (11). Maslow's hierarchy of needs, which comprises a five-tier model of human needs, explained that when a person does not get enough food, the human body is unable to function optimally (12). Food insecurity may give a negative impact on physical and emotional health as well as academic performance, especially for undergraduate students (13). Prolonged exposure to food insecurity may contribute to several problems, such as the risk of malnutrition (14), poor mental health (4,15) and low academic performance (8,16). It is comprehended that students with food insecurity problems may focus more on obtaining food rather than achieving goals in their academic performances (17). To overcome the challenges of food insecurity, undergraduate students may choose to implement coping strategies related to food insecurity.

Coping strategies related to food insecurity are practices used to boost food accessibility in households (2,17). Coping strategies can be divided into two categories, namely food-related coping strategies and non-food-related coping strategies. Food-related coping strategies involve short-term food obtaining activities to address food shortages, including reducing the amount of food consumed, borrowing money to buy food, and skipping meals (2). Non-food-related coping strategies or long-term livelihood coping strategies include working part-time, borrowing money from relatives, and suspending payment of bills (2). It was found that coping strategies were associated with food insecurity and the strong predictors of food insecurity included borrowing money for food from parents, asking others for food, and selling belongings to earn money for food (18). Undergraduate students use a variety of coping strategies, such as skipping meals, lowering the quality or variety of their food, and failing to purchase necessary educational supplies to combat food insecurity. These strategies have a negative influence on their academic performance (15,16). A previous study that consisted of 30 undergraduate students in South Africa who received financial aid reported using almost similar coping strategies as the earlier studies, such as avoiding expensive food, sharing food and meal preparation schedules, eating fewer meals and eating food at home (19).

Despite food insecurity being a significant issue amongst undergraduate students, there is still insufficient studies conducted on food insecurity and coping strategies amongst undergraduate students. For the Malaysian population, several studies have been conducted on food insecurity amongst undergraduate students (7,8,16), however only limited studies focused on coping strategies to handle the issue of food insecurity. Since coping strategies are associated with food insecurity

amongst undergraduate students (18), it is worthwhile to explore the coping strategies related to food insecurity to identify the ability of students in handling their food insecurity (8). Furthermore, there are limited studies exploring food insecurity and coping strategies amongst undergraduate students during the COVID-19 pandemic in Malaysia. A previous study that explored food insecurity amongst the community in Sarawak, Malaysia found that they were food secure during the COVID-19 pandemic and implemented several coping strategies, such as finding alternative food sources and marketplace (20). Therefore, this study is aimed at exploring the food insecurity status and coping strategies adopted by undergraduate students.

MATERIALS AND METHODS

Study design and setting
A cross-sectional study was conducted on 383 undergraduate students from Year 1 until Year 5 living on campus at the International Islamic University Malaysia (IIUM), Kuantan campus. IIUM Kuantan campus basically for health-related courses such as nursing, medicine, dentistry, allied health science, pharmacy and science.

Study participants and sampling
The sampling method used in this study was a convenience sampling method. The participants were undergraduate students from IIUM Kuantan campus. The inclusion criteria were undergraduate students of Year 1, Year 2, Year 3, Year 4, and Year 5 from all kulliyyah (faculties) at IIUM Kuantan campus. The exclusion criteria were undergraduate students that live off-campus (staying with their families).

Data collection tool and technique
After ethical approval was obtained, the researcher started distributing the questionnaire with the informed consent and participant information sheet through social media platforms. The participants who fulfilled the inclusion criteria and willing to participate were included in this study. The questionnaire had been set to decline any responses soon after the required number of responses had been achieved. A questionnaire consisting of three parts, i.e., socio-demographics, food insecurity, and coping strategies, was used for data collection. Part A, which was socio-demographic background comprised of gender, faculty of study, academic year, parents' monthly income, financial status, academic cumulative grade point average (CGPA), average monthly expenses, and working part-time. Part B comprised of food insecurity, which was measured using the Radimer Cornell scale (21). The Radimer Cornell scale consisted of eight questions, whereby the rating scales listed were "never", "sometimes", "often" and "always". The scoring scale for "never" and "sometimes" were coded as 0, whilst "often" and "always" were coded as 1. The total scores were classified as 0 to 4 points for food security

whereas 5 to 8 points as food insecurity.

For Part C, the coping strategies were measured by adapting the Malaysian Coping Strategies Instruments (MCSI) (22). There were 14 questions in total, which were divided into two parts with nine questions on food-related coping strategies and five questions on non-food coping strategies. The score ranged from "never" (0) to "every day" (7). A higher score is considered a greater level of food insecurity. A pilot study was conducted and found good internal consistency in Part B (Cronbach's alpha of 0.70) and Part C (Cronbach's alpha of 0.86). The period of data collection was within two months starting from October to November 2020.

Data analysis
The data collected were analysed using a computer statistical program, IBM Statistical Package for the Social Sciences (SPSS) version 26 as descriptive and inferential analyses, such as Chi-Square, Mann-Whitney, and Kruskal-Wallis. P value of <0.05 was set as statistically significant.

For the association between socio-demographic background and food insecurity, the data were analysed using the Chi-Square test. The association between socio-demographic background and coping strategies was analysed using the Mann-Whitney and Kruskal-Wallis tests. The Mann-Whitney test was used to analyse gender and working part-time with coping strategies. The Kruskal-Wallis test was used to analyse the association between faculty of study, academic year, financial status, academic performance and monthly expenses with coping strategies

Ethical consideration
This study received ethical approval from IIUM Research Committee (IREC2020-KON2/40). Online informed consent was obtained for each participant. The identity of the participants was ensured to remain confidential.

RESULTS

Table I shows the socio-demographic background of the participants involved in this study. The majority of participants were females (80.4%). The highest number of participants were from Kulliyyah of Allied Health Sciences and Kulliyyah of Nursing, which were 24.5% and 24.0%, respectively. It was found that almost half of the participants were Year 4 students (43.6%). The majority of participants (55.1%) reported their parents' monthly income of >RM3,000. The findings revealed that 73.9% of the participants reported having financial support, either through loans or scholarships. The majority of students (40.5%) had an academic CGPA of 3.50 – 4.00. Monthly expenses were divided into four groups with the highest percentage belonging to participants (32.6%) who spent RM200 – RM300 on monthly expenses. It was found that the majority of

Table I: Socio-demographic Background

Socio-demographic background	Frequencies (N=383)	Percentage (%)
Gender		
Male	75	19.6
Female	308	80.4
Faculty of study		
Kulliyyah of Allied Health Sciences	94	24.5
Kulliyyah of Dentistry	33	8.6
Kulliyyah of Medicine	33	8.6
Kulliyyah of Nursing	92	24.0
Kulliyyah of Pharmacy	38	10.0
Kulliyyah of Science	93	24.3
Academic year		
Year 1	36	9.4
Year 2	82	21.4
Year 3	70	18.3
Year 4	167	43.6
Year 5	28	7.3
Parents' monthly income		
<RM2000	99	25.9
RM2000 – RM2499	42	11.0
RM2500 – RM3000	31	8.0
>RM3000	211	55.1
Financial status		
Loans	139	36.3
Scholarships	144	37.6
Self-finance	100	26.1
Academic CGPA		
2.50 – 2.99	16	4.1
3.00 – 3.49	144	37.6
3.50 – 4.00	155	40.5
Pass	68	17.8
Average monthly expenses		
<RM100	49	12.8
RM100 – RM199	105	27.4
RM200 – RM300	125	32.6
>RM300	104	27.2
Working part-time		
Yes	74	19.3
No	309	80.7

participants (80.7%) did not work part-time.

Food insecurity status and coping strategies amongst undergraduate students
Of the 383 participants involved in this study, 21.41% reported experiencing food insecurity. The median score of coping strategies was 38.00 and the interquartile range was 38.50. Table II shows the frequency of coping strategies used by the participants in dealing with food insecurity. The most frequent coping strategies used by the participants daily were planning for expenditure (27.2%) and reducing the number of meals per day (21.7%). The least frequent coping strategies that the participants selected as never used were purchasing food on credit (84.8%), borrowing money from friends for food (74.2%), receiving food assistance from friends (72.6%) and engaging in part-time jobs (70.8%).

Association between socio-demographic factors and food insecurity
Table III shows the association between socio-demographic factors and food insecurity. There was a significant association between parents' income (p<0.001), financial status (p<0.001), academic performance (p = 0.04) and working part-time (p = 0.01) with food insecurity.

Table II: Coping Strategies Used by Participants (N=383)

Coping strategies	N (%)
Eat inexpensive food	
Never	31 (8.1)
Once a week	137 (35.8)
2-3 days/week	127 (33.1)
4-6 days/week	67 (17.5)
Daily	21 (5.5)
Reduce the types of dishes	
Never	98 (25.6)
Once a week	96 (25.1)
2-3 days/week	90 (23.5)
4-6 days/week	51 (13.3)
Daily	48 (12.5)
Reduce the number of meals per day	
Never	105 (27.4)
Once a week	68 (17.7)
2-3 days/week	70 (18.3)
4-6 days/week	57 (14.9)
Daily	83 (21.7)
Cook own food at college/rented house	
Never	169 (44.1)
Once a week	85 (22.2)
2-3 days/week	76 (19.8)
4-6 days/week	35 (9.2)
Daily	18 (4.7)
Share food with friends	
Never	155 (40.5)
Once a week	111 (29.0)
2-3 days/week	74 (19.3)
4-6 days/week	26 (6.8)
Daily	17 (4.4)
Borrow money from friends for food	
Never	284 (74.2)
Once a week	79 (20.6)
2-3 days/week	18 (4.7)
4-6 days/week	2 (0.5)
Daily	-
Skip meals the whole day	
Never	178 (46.5)
Once a week	108 (28.2)
2-3 days/week	86 (22.5)
4-6 days/week	10 (2.6)
Daily	1 (0.2)
Receive food assistance from friends	
Never	278 (72.6)
Once a week	64 (16.7)
2-3 days/week	33 (8.6)
4-6 days/week	7 (1.8)
Daily	1 (0.3)
Purchase food on credit	
Never	325 (84.8)
Once a week	38 (9.9)
2-3 days/week	14 (3.7)
4-6 days/week	5 (1.3)
Daily	1 (0.3)
Being thrifty in using money	
Never	66 (17.2)
Once a week	106 (27.7)
2-3 days/week	103 (26.9)
4-6 days/week	45 (11.7)
Daily	63 (16.4)
Reduce personal expenses	
Never	60 (15.6)
Once a week	100 (26.1)
2-3 days/week	96 (25.1)
4-6 days/week	54 (14.1)
Daily	73 (19.1)
Plan for expenditure	
Never	61 (15.9)
Once a week	85 (22.2)
2-3 days/week	87 (22.7)
4-6 days/week	46 (12.0)
Daily	104 (27.2)
Request money from relatives or friends	
Never	205 (53.5)
Once a week	113 (29.5)
2-3 days/week	42 (11.0)
4-6 days/week	17 (4.4)
Daily	6 (1.6)
Engage in part-time jobs	
Never	271 (70.8)
Once a week	40 (10.4)
2-3 days/week	32 (8.4)
4-6 days/week	18 (4.7)
Daily	22 (5.7)

Table III: Association between Socio-demographic and Food Insecurity

Socio-demographic data	Food security (%)	Food insecurity (%)	X² (df)	P value
Gender				
Male	57 (76.0)	18 (24.0)	0.372 (1)	0.54
Female	244 (79.2)	64 (20.8)		
Faculty of study				
KOM	28 (84.8)	5 (15.2)	11.050 (5)	0.05
KOP	34 (89.5)	4 (10.5)		
KOD	29 (87.9)	4 (12.1)		
KON	64 (69.6)	28 (30.4)		
KAHS	70 (74.5)	24 (25.5)		
KOS	76 (81.7)	17 (18.3)		
Academic Year				
Year 1	27 (75.0)	9 (25.0)	6.340 (4)	0.18
Year 2	67 (81.7)	15 (18.3)		
Year 3	57 (81.4)	13 (18.6)		
Year 4	124 (74.3)	43 (25.7)		
Year 5	26 (92.9)	2 (7.1)		
Parents income				
<RM2000	69 (69.7)	30 (30.3)	14.588 (3)	<0.001*
RM2000 – RM2500	30 (71.4)	12 (28.6)		
RM2500 – RM3000	21 (67.7)	10 (32.3)		
>RM3000	181 (85.8)	30 (14.2)		
Financial status				
Loans	92 (66.2)	47 (33.8)	21.294 (2)	<0.001*
Scholarships	127 (88.2)	17 (11.8)		
Self-finance	82 (82.0)	18 (18.0)		
Academic CGPA				
2.50 – 3.00	10 (62.5)	6 (37.5)	8.198 (3)	0.04*
3.00 – 3.50	109 (75.7)	35 (24.3)		
3.50 – 4.00	121 (78.1)	34 (21.9)		
Pass	61 (89.7)	7 (10.3)		
Monthly expenses				
<RM100	36 (73.5)	13 (26.5)	4.555 (3)	0.21
RM100 – RM200	79 (75.2)	26 (24.8)		
RM200 – RM300	97 (77.6)	28 (22.4)		
>RM300	89 (85.6)	15 (14.4)		
Working part-time				
Yes	50 (67.6)	24 (32.4)	6.623 (1)	0.01*
No	251 (81.2)	58 (18.8)		

Note: KOM: Kulliyyah of Medicine; KOP: Kulliyyah of Pharmacy; KOD: Kulliyyah of Dentistry; KON: Kulliyyah of Nursing; KAHS: Kulliyyah of Allied Health Sciences; KOS: Kulliyyah of Science; * P value < 0.05

Association between socio-demographic background and coping strategies

Working part-time had a significantly higher median score of MCSI (Median (Mdn) = 44.50, Interquartile range (IQR) = 40.63) than not working part-time (Mdn = 24.50, IQR = 33.50), Z = -5.64, p = <0.001. There was no significant difference between male (Mdn = 28.50, IQR = 37.50) and female (Mdn = 28.00, IQR = 39.38) in relation to coping strategies (Z = -1.17, p = 0.24).

Table IV shows the significant associations between socio-demographic background with coping strategies (MCSI). Kulliyyah of Nursing (KON) had a significantly higher median score of MCSI (Mdn = 36.00, IQR =29.63) than the other Kulliyyahs (p < .001). The Year 4 students had a significantly higher MCSI median score of (Mdn = 33.50, IQR = 40.00) than those of Year 1 (Mdn = 29.50, IQR = 25.75), Year 2 (Mdn = 28.25, IQR = 39.50), Year 3 (Mdn = 29.50, IQR = 35.00), and Year 5 (Mdn = 10.25, IQR = 10.75) (p < .001). Students who have loans had a significantly higher MCSI median score (Mdn = 34.50, IQR = 41.00) than those with scholarships (Mdn = 16.00, IQR = 30.63) and self-finance (Mdn = 30.75, IQR = 37.00) (p < .001). Students with the lowest

Table IV: Association between Socio-demographic Factors and Coping Strategies

Socio-demographic data	Median (IQR)	Test statistics (df)	P value
Faculty of Study			
KOM	14.50 (32.75)	27.92 (5)	<0.001
KOP	22.00 (34.75)		
KOD	13.50 (21.00)		
KON	36.00 (29.63)		
KAHS	24.75 (30.48)		
KOS	29.50 (44.50)		
Academic Year			
Year 1	29.50 (25.75)	26.01 (4)	<0.001
Year 2	28.25 (39.50)		
Year 3	29.50 (35.00)		
Year 4	33.50 (40.00)		
Year 5	10.25 (10.75)		
Parents income			
<RM2000	31.00 (43.50)	5.46 (3)	0.14
RM2000 – RM2500	29.00 (37.88)		
RM2500 – RM3000	39.00 (46.00)		
>RM3000	25.00 (33.00)		
Financial status			
Loans	34.50 (41.00)	31.79 (2)	<0.001
Scholarships	16.00 (30.63)		
Self-finance	30.75 (37.00)		
Academic CGPA			
2.50 – 3.00	35.00 (40.88)	23.51 (3)	<0.001
3.00 – 3.50	32.00 (37.75)		
3.50 – 4.00	30.50 (40.00)		
Pass	12.25 (21.00)		
Monthly expenses			
<RM100	39.00 (35.25)	12.39 (3)	0.01
RM100 – RM200	25.50 (35.00)		
RM200 – RM300	29.50 (41.50)		
>RM300	19.50 (32.50)		

Note: KOM: Kulliyyah of Medicine; KOP: Kulliyyah of Pharmacy; KOD: Kulliyyah of Dentistry; KON: Kulliyyah of Nursing; KAHS: Kulliyyah of Allied Health Sciences; KOS: Kulliyyah of Science; * P value < 0.05

academic CGPA (2.50-3.00) had a significantly higher MCSI median score (Mdn = 35.00, IQR = 40.88) than those with a CGPA of 3.00-3.50 (Mdn = 32.00, IQR = 37.75), CGPA of 3.50 – 4.00 (Mdn = 30.50, IQR = 40.00) and pass (Mdn = 12.25, IQR = 21.00) (p < .001). Students with monthly expenses of less than RM100 had a significantly higher MCSI median score (Mdn = 39.00, IQR = 35.25) than RM100-RM200 (Mdn = 25.50, IQR = 35.00), RM200-RM300 (Mdn = 29.50, IQR = 41.50), and those spending more than RM300 per month (Mdn = 19.50, IQR = 32.50) (p = 0.01).

Post hoc (pairwise comparison test) findings for faculty (kulliyyah) of the study revealed that Kulliyyah of Allied Health Sciences (Mdn = 36.00, IQR = 29.63) had a significantly higher MCSI median score than Kulliyyah of Medicine (Mdn = 14.50, IQR = 32.75), Z = -3.30, p = <0.001. Kulliyyah of Nursing (Mdn = 36.00, IQR = 29.63) had a significantly higher MCSI median score than Kulliyyah of Dentistry (Mdn = 13.50, IQR = 21.00), Z = -4.77, p = <0.001. Kulliyyah of Science (Mdn = 29.50, IQR = 44.50) had a significantly higher MCSI median score than Kulliyyah of Dentistry (Mdn = 13.50, IQR = 21.00), Z = -3.08, p = <0.001.

Post hoc analysis for academic year found that Year 1 (Mdn = 29.50, IQR = 25.75) had a significantly higher MCSI median score than Year 5 (Mdn = 10.25, IQR = 10.75), Z = -4.08, p = <0.001; Year 2 (Mdn = 28.25, IQR = 39.50) had a significantly higher MCSI median score than Year 5 (Mdn = 10.25, IQR = 10.75), Z = -4.05, p = <0.001; Year 3 (Mdn = 29.50, IQR = 35.00) had a significantly higher MCSI median score than Year 5 (Mdn = 10.25, IQR = 10.75), Z = -3.37, p = <0.001; and Year 4 (Mdn = 33.50, IQR = 40.00) had a significantly higher MCSI median score than Year 5 (Mdn = 10.25, IQR = 10.75), Z = -4.85, p = <0.001.

Post hoc analysis for financial status revealed that loans (Mdn = 34.50, IQR = 41.00) had a significantly higher MCSI median score than scholarships (Mdn = 16.00, IQR = 30.63), Z = -5.49, p = <0.001; self-finance (Mdn = 30.75, IQR =37.00) had a significantly higher MCSI median score than scholarships (Mdn = 16.00, IQR = 30.63), Z= -3.54, p = <0.001.

Post hoc analysis for academic performances showed that academic CGPA 3.00 – 3.50 (Mdn = 32.00, IQR = 37.75) had a significantly higher MCSI median score than pass (Mdn = 12.25, IQR = 21.00), Z = -4.80, p = <0.001. It was also discovered that academic CGPA 3.50 – 4.00 (Mdn = 30.50, IQR = 40.00) had a significantly higher MCSI median score than pass (Mdn = 12.25, IQR = 21.00), Z = -4.04, p <0.001.

Post hoc analysis of monthly expenses revealed that monthly expenses of less than RM100 (Mdn = 39.00, IQR = 35.25) had a significantly higher MCSI median score than the expenses of more than RM300 (Mdn = 19.50, IQR = 32.50), Z = -2.81, p = 0.04. It was also revealed that the monthly expenses of RM200 – RM300 (Mdn = 29.50, IQR = 41.50) had a significantly higher MCSI median score than >RM300 (Mdn = 19.50, IQR = 32.50), Z = -2.99, p < 0.001.

Association between food insecurity and coping strategies

There was a significant association between food insecurity and coping strategies; Z = -8.21, p < 0.001. The data were analysed using the Mann-Whitney test.

DISCUSSION

Generally, it was found that the prevalence of food insecurity amongst undergraduate students was 21.41%, which was congruent with previous studies that reported 22% to 67.7% of undergraduate university students in Malaysia experienced food insecurity (2,7,8). The finding indicates that undergraduate students are experiencing financial and economic difficulties, which may be impacting their food intake. Since the COVID-19 pandemic hit the country in early 2020, the time of the survey could have influenced the results and the prevalence of food insecurity is predicted to be higher than previous studies. However, the prevalence of food insecurity was found to be comparable with earlier studies. This could be related to the university's efforts

to provide food supplies to the students who stayed on campus during the COVID-19 pandemic.

The most frequent coping strategies used by the participants were planning for expenditure (27.2%). However, this finding contradicted the previous finding that food insecure students were more likely to display high money expenditures due to poor spending behaviour (18). Another most frequent coping strategy used by undergraduate students was reducing the number of meals (27.1%). This approach can be viewed as self-decisions to minimize the impact of food insecurity (23). This finding was also congruent with a previous study that involved Malaysian undergraduate students that reported 66% of the undergraduate students reduced the number of meals or skipped the meals (8).

The present study found that there was an association between parents' income, financial status, academic performance, and working part-time with food insecurity. The finding was consistent with previous studies whereby there were significant associations between parents' income (16) and financial status (6,16) with food insecurity. It can be concluded that students with lower parent income and financial status tend to face food insecurity problems more often since they have limited funds to spend on food (19). It was found that students who had food insecurity reported a lower grade point average (GPA). It can be postulated that students with limited access to adequate food had problems focusing on their studies which lead to poor academic performance (18). However, a lower GPA may result from a number of factors, including personal or familial stressors that is unrelated to food insecurity (5). While there are other factors that affect students' academic performance, there is still a need for university authorities to address this issue. Furthermore, the present study discovered that working part-time amongst undergraduate students was found to be associated with food insecurity. Only 19.3% of the undergraduate students in the present study had part-time jobs as it is uncommon for undergraduate Malaysian students to work part-time. Working part-time is a commonly reported practice because a lack of money to buy food is one of the main causes of food insecurity (17). Food-secure students may not need to work for money, while food-insecure students may work to meet their financial commitments (10).

There were significant associations between working part-time, monthly expenses, financial status, faculty of study, academic year, and academic CGPA with MCSI median scores. Working part-time was associated with a higher frequency of practicing coping strategies. These results suggest that the students decided to work part-time to get a side income to cope with food insecurity problems. The result showed that there was a significant association between monthly expenses and high MCSI median scores. This study suggests that monthly expenses decrease with increasing food insecurity. The majority of students claimed that they spent about RM200 – RM300 monthly on food. In this study, Kulliyyah of Nursing reported higher MCSI median scores which means they were frequently practicing coping strategies as compared to the other kulliyyah. There was an association between academic year and MCSI median scores. In the present study, the most significant group was Year 5, whereby the seniors reported lower MCSI scores than the juniors indicating they were more food-secure than the juniors. Academic performance was also associated with higher MCSI median scores, which was similar to a previous study (18). Those with lower CGPA reported more food-insecure than those with higher CGPA. Moreover, this study discovered that there was a significant association between food insecurity and MCSI median scores, which was similar to a previous study (18). It was found that those who experienced food insecurity reported frequently practicing coping strategies to deal with food insecurity. It demonstrates that frequency and types of coping strategies among undergraduate students play an essential role in determining students' food insecurity (16).

The present study was conducted at one university geographically located in the eastern region of Malaysia, making it difficult to generalise to the other populations of undergraduate university students such as those at private institutions. Despite the limitations, this study makes a significant contribution to the related field, especially when considering the lack of research on the topic of food insecurity and coping strategies amongst undergraduate students. For future studies, it might be possible to use a different approach, such as using a qualitative approach to capture more information related to the coping strategies applied to overcome food insecurity problems. Future research should also involve universities from several states to determine whether percentages of food insecurity are the same in several geographic locations across the country.

CONCLUSION

Overall, the prevalence of food insecurity among undergraduate students was congruent with previous studies. Findings identify important sociodemographic correlates of food insecurity namely parents' income, financial status, academic performance, and working part-time. This study strengthens the idea of the associated factors related to coping strategies amongst undergraduate students namely working part-time, monthly expenses, financial status, faculty of study, academic year, and academic CGPA. As identified in this study, those from lower-income families were associated with food insecurity. Future studies may consider interviewing undergraduate students from lower-income families to explore the coping strategies that are commonly used by this group. Coping strategies to overcome food insecurity are an important element

to be applied amongst undergraduate students since being unable to cope with food insecurity problems could lead to poor academic performance. Since coping strategies are frequently employed, it is crucial to ensure that they do not negatively impact students, particularly when changing dietary patterns is involved. These coping strategies must be identified and eradicated among the students. Our findings indicate the necessity for undergraduate students to be screened for food insecurity and the development of evidence-based support programs to address food insecurity.

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